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COSTS OF ALMOND PRODUCTION IN CALIFORNIA

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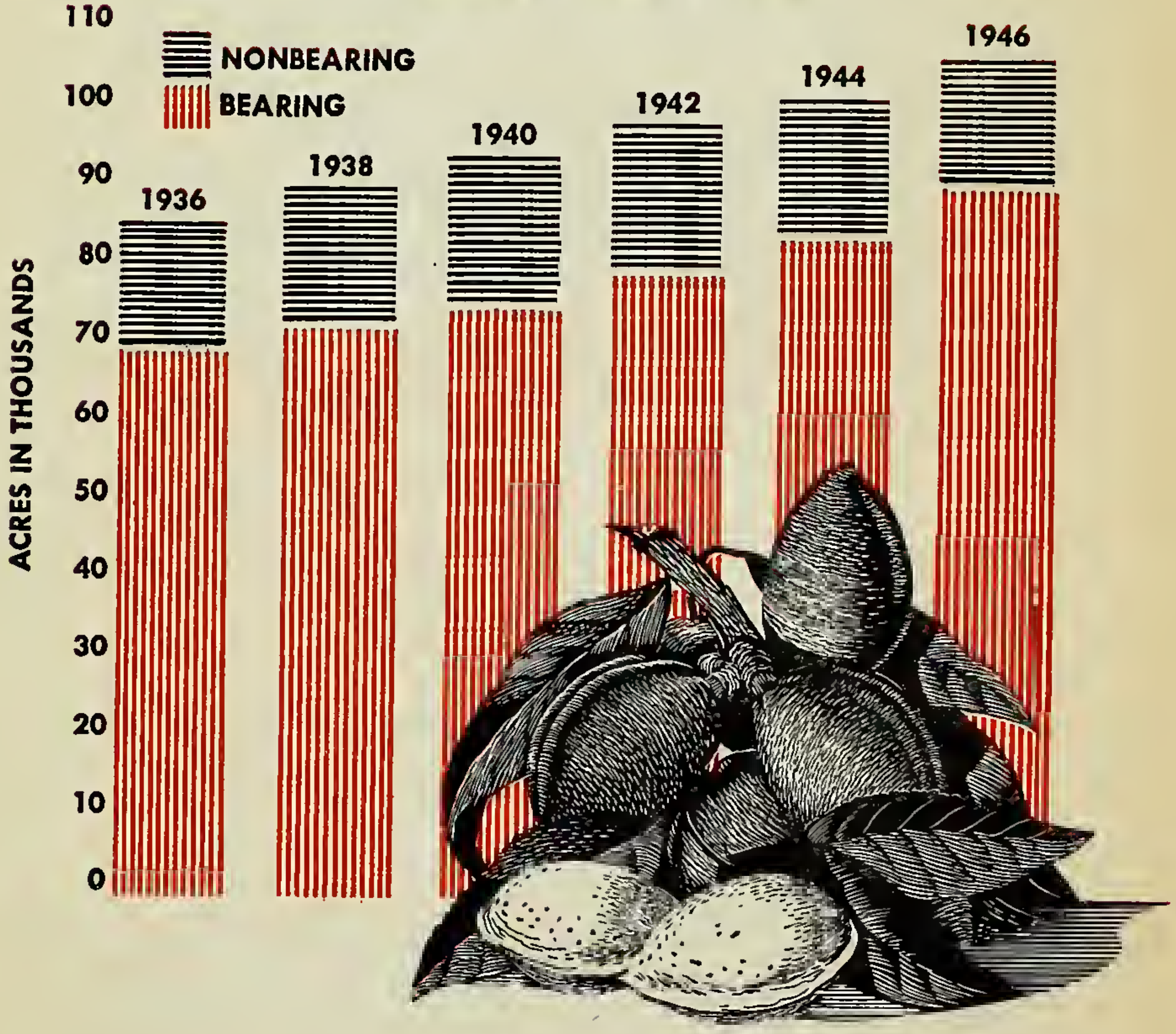
CALIFORNIA ALMOND ACREAGE



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COSTS OF ALMOND PRODUCTION IN CALIFORNIA

R. L. Adams[1] and A. D. Reed[2]

The cost determinations in this circular are intended to help an almond orchardist in four ways by:

1. Indicating net returns and emphasizing need for economy in making farming plans.
2. Indicating capital needed to establish and mature new plantings.
3. Aiding in fixing a fair credit basis for both long- and short-term loans.
4. Giving information helpful when tariffs are being revised, reciprocal trade agreements negotiated, or ceilings set for farm prices.

The need for such cost determinations is based on the fact that almond production is an important and established industry in California. The value of the crop and the basis of returns to growers averaged for 1943, 1944, and 1945, place the almond seventh on the list of all deciduous tree fruits and nuts (1).[3]

Acreage

The acreage planted to almonds over the years has gradually increased until today almond orchards cover 103,731 acres. Of this total, 92,040 acres are bearing and 11,691 acres, nonbearing (2). Almond acreage is exceeded only by oranges, peaches, prunes, and walnuts. Even peaches, which cover 104,257 acres, exceed by only a relatively few acres.

The size of producing orchards is indicated by tabulations from various districts for 1,820 almond orchards. These cover 31,683 acres. Although not all orchards in a given locality are listed, the figures give a good sample. They show an average size of 17 acres, but they vary by districts of from 8 to 47 acres. The majority of orchards were under 20 acres. For instance, 1,319—or 73 per cent of the 1,820 orchards tabulated—fell into the 20-acre group. Of the 1,820 orchards, the percentage falling into groups by size may be summarized as follows:

Size of acres	*Number*	*Percentage*
Under 20	1,319	73
20 to 40	330	18
40 to 80	129	7
Over 80	42	2
Total	1,820	100

Larger almond acreages are reported, in another tabulation, for 29 of the 58 counties of the state. Mature orchards totaling 500 acres or more, listed in order of acreage, are in San Luis Obispo, Butte, Colusa, Yolo, San Joaquin, Stanislaus, Contra Costa, Merced, Sutter, Glenn, Monterey, Tehama, Los Angeles, and Riverside counties. Thus, extensive plantings occur as far north as Tehama County in the Sacramento Valley; in central coast areas in San Joaquin, Stanislaus, and Merced counties of the San Joaquin Valley; and as far south as Los Angeles and Riverside counties.

Yields

An important factor in the costs of almond production is the increase in yields up to a 1946 production estimated at

35,100 tons (in-shell basis) (3). However, mature orchards do vary in yield from year to year because of variation in weather, which affects the set. Production during the past five years is reported in the following text table.

It must be noted, however, that average production for the state from year to year covers a great variation in yields between different producing districts and between different orchards.

Year	*Total production (tons, in-shell)*	*Acreage (bearing)*	*Average production (pounds per acre)*
1946	35,100*	92,040	763
1945	23,800 (3)	88,510	522
1944	21,000	84,800	495
1943	16,000	82,500	388
1942	22,000	79,200	556
1941 (5) ..	6,000	77,032	156

* Preliminary figure.

COST OF PRODUCING ALMONDS

This publication shows not only items of cost, but also method of figuring costs and findings for the 1946 crop. The total cost of producing almonds is based on yield in pounds per acre of in-shell nuts.

Items of Cost

The larger part of the total cost consists of outlays for the following activities and items:

- I. Care of orchard and harvesting (includes wages of workers, use of motive power, use of hand tools, implements, and machinery)
    - Pruning and suckering
    - Removing brush
    - Green-manuring (covercropping)
    - Frost protection
    - Spraying
    - Irrigating
    - Cultivating
    - Hoeing around trees
    - Fertilizing
    - Preparing for harvesting
    - Harvesting
    - Hauling from field
    - Hulling and sacking
    - Drying
    - Hauling to receiving shed
- II. Supplies and materials
    - Covercrop seed
    - Heater fuel
    - Spray materials and dusts
    - Irrigation water
    - Fertilizer
- III. Miscellaneous
    - Sacks
    - Taxes
    - Charge for management
    - Tree depreciation
    - Interest for use of capital (both on money represented by current worth of orchard and on operating funds)
    - Compensation insurance
    - Office expense

To figure the costs of an individual orchard, of the average for a locality, or of the general average for the industry as a whole, the items listed above, in addition to yield per acre, must be known.

Few orchardists keep complete records of all costs, especially overhead charges. Hence, early in this study we were obliged to determine certain basic charges. These included use of equipment, depreciation, management, and orchard values (as a basis for calculating an interest charge for use of capital). These determinations apply to conditions during the early fall of the 1946 crop year. They reflect actual expenses at the time the information was collected, supplemented with estimates for expenditures yet to be made during the remainder of the crop year.

Variation in Items of Cost

Cultural practices and harvesting operations follow a somewhat common pattern. However, different kinds and sizes of equipment, use of fertilizers, spraying programs, and methods of frost protection vary with different localities—even between farms in the same locality. Some areas practice irrigation; others are not equipped to irrigate. Since practices vary, this full list of items will seldom apply to an individual orchard. For instance, irrigation may not be generally practiced—as in much of the San Miguel-Paso Robles area—fertilizing may be omitted, and spraying may be confined to a single application or omitted entirely. Thus, an individual determination is needed for a given farm or area.

Costs for 1946 Compared with Previous Costs

The cost of producing almonds in California is steadily increasing. Data collected by the senior author for orchards producing 1,000 pounds of almonds per acre are as follows:

Years	*Cost per lb. in-shell*
1935–1940	0.14
1943	0.19
1946	0.20

The increased cost in 1946 is largely the result of a marked rise in the cost of labor ($1.00 an hour for most of the state), sprays, fertilizers, sacks, and green-manure seed. Higher taxes and unusual interest charge on capital have placed a higher value on orchards than during any previous study. Offsetting these increased costs is the factor of markedly higher yields. This has been brought about by a favorable season and better cultural practices, improved frost protection, greater use of fertilizers, more and better spraying and pest control, more use of green-manure crops, more attention to pruning, and more and better use of irrigation water.

Almond orchards are now given care comparable with that given to other deciduous fruits. To a greater extent than ever before, almonds now share the good lands. These two factors place the almond industry high on the list of agriculture's contribution to the wealth of the state.

IMPROVED PRACTICES FOR ALMOND PRODUCTION

A marked attempt has been made in the last decade to improve almond culture in the state. The following summary gives the more important changes which have occurred.

Soil

Originally a large acreage of the orchards was on soils considered too poor for any other tree crop, yet thought suitable to almonds. During the past two decades in most of the producing areas, there has been a marked migration of almond orchards to the better type soils.

Planting Distance

Trees in the early orchards were set 25 feet apart, but in many of the present orchards are being set at 30-foot distances. The 25-foot plantings tend to exhaust the soil moisture too quickly in dry-farmed areas, and to cause the trees to interlock if they grow large. The 30-foot plantings avoid these difficulties without reducing yields.

Pruning

Almonds require less pruning than other fruit trees. Nevertheless, experience indicates that proper and sufficient pruning of young trees which are easy to handle lessens the need for heavy pruning after the trees are large and hard to work. However, annual pruning of bearing trees is necessary to maintain production.

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[3] Numbers in parentheses refer to references listed at the end of this circular.

Frost Protection

The use of wind machines has met with varied success in different parts of the state. They appear to be adequate in areas where damage is not likely to be severe, and where the warm air ceiling is not too high. Although not useful everywhere for protection, wind machines may be valuable in limited areas and on certain nights. Major drawbacks in their use are high cost of installation and danger from breakdowns, during which a crop may be lost.

Fertilization

The increased use of fertilizer has produced larger yields, better quality nuts, better resistance to red spider, and better tree health generally. Its use is necessary for the profitable future of the industry.

Cultivation

Soil culture need be only the turning under of covercrops and the killing of weeds. Plowing has generally been replaced by disking, which is becoming shallower. Summer cultivation is now merely keeping the weeds from competing with the trees. Absolutely clean cultivation during the summer is not considered necessary or economical, except occasionally under dry-farming conditions.

Irrigation

More of the almond acreage is being put under irrigation every year, although the amount of water applied per acre has remained relatively steady. This practice both increases and stabilizes yields from year to year, and tends to place the industry on a sounder basis.

Drying

In areas where most of the crop must be dried, mechanical driers, using a draught of hot air to dry the nuts in the sack, are being built as fast as materials are available. This practice saves a large amount of labor and hastens drying.

Labor-saving Methods and Devices

Orchardists have seriously tried to reduce the amount of labor necessary to produce a crop. Some of the results of these efforts are described below.

Almonds are hauled to the huller in "boats." Then, by use of a mechanical hoist they are dumped into a hopper, from which they are mechanically fed into the huller; or they may be hoisted to an overhead bin to be fed into the huller—a practice followed by many growers. The sacking is then done during slack periods, often by family labor. Although this method necessitates the use of additional boats, many almond growers feel that the labor pays for their use.

Numerous homemade hull spreaders are in use throughout the state. Their advantage is not so much in saving the time spent in spreading the hulls as in reducing the time the huller crew is idle while the hulls are being disposed of.

The practice of hoeing has practically disappeared from many parts of the state except in dry-farmed areas. Not only is it considered unnecessary, but some growers think it is a medium through which crown gall may be spread.

Some practices seem of doubtful value. One is the picking of nuts from the tailings of the huller. If too few nuts are recovered to pay the wages of the pickers, this operation is uneconomical. For example, the wages of two women on the tailings at 85 cents an hour for 8 hours would be $13.60. With almonds priced at 35 cents a pound, the pickers would have to recover 40 pounds of nuts to pay their wages. If the recovery is less than this, a farmer would be money ahead to let the nuts go out with the hulls. This same type of analysis may be applied to other operations.

OTHER SUGGESTED IMPROVEMENTS

There is a *best* way to operate every farm and every enterprise on a given farm. This best way, however, varies from locality to locality and from farm to farm within the same locality. This statement applies to almond crops as well as to all other fruit, field, and truck crops, and also to livestock. The following suggestions should be considered by every almond grower as aids to the *best* type of operation.

Spraying for Mites (red spider)

As soon as evidence of the pest is seen, spray with 1½ per cent summer oil, and follow with a second application 7 to 10 days later. Use of 1 pound of DN-111 commercial mixture to 100 gallons of water shows promise as a control measure, but experimental information on which to base a definite recommendation for its use is lacking. Growers may secure information from the California Agricultural Experiment Station at the University of California on the results of DN-111 and other new sprays being developed and tested. Dusting with sulfur has become less useful for mite control because a strain of mites appears to have developed, which are resistant to it and which are spreading rapidly over the state.

Control of Peach-twig Borer

Spray with 3 pounds of basic arsenate of lead per 100 gallons of spray mixture when the petals have fallen from two thirds of the blossoms. Repeat in May when the first wilted shoots appear.

Control of Certain Diseases

For control of brown rot, blossom blight, and shot-hole diseases of almonds two steps in spraying are followed: (1) Spray with a bordeaux mixture, 10-10-100, or equivalent concentrations of other good copper fungicides, after the unopened blossoms emerge from the winter buds. Where brown rot has been serious in previous years, or where unusually wet weather is expected during the blooming period, a second application to cover the blossoms more completely can be made when the earlier blossoms have opened. These prebloom sprays are intended to control both diseases. (2) Give an application of bordeaux, 6-6-100, or its equivalent in other copper fungicides, after petals are off the tree. This application is made to protect young leaves and fruits against infection by the shot-hole fungus.

Irrigation

Study the moisture requirements of each orchard, and plan an adequate supply of water. Avoid too much drying out of the soil, and do not apply too much water when irrigating. While there is no specific rule as to how often you should irrigate, a minimum of twice is suggested: (1) Give one irrigation when the moisture from the winter rains has been used up (in June or early July), and follow by other irrigations at 3- to 5-week intervals (depending upon the moisture-retentive capacity of the soil). Stop irrigating in time to permit the surface soil to dry out for harvesting. This means that one to two additional irrigations are advisable following the last spring or early summer irrigation. Sufficient water should be applied to insure a good feeding zone within the soil to a depth of 6 to 8 feet. (2) Give the second irrigation in the fall, and while the leaves are still on, if the normal natural rainfall is unable to saturate the soil to the desired depth. Also, if the winter rainfall is not enough, give one irrigation in the spring, as soon as spraying and other necessary winter operations are out of the way, to soak the soil.

Fertilization

Study the plant needs of each almond orchard, and follow a program of adequate fertilizing. Use more animal manures and green-manure crops as well as commercial fertilizers. The mineral element most needed is usually nitrogen. Since an adequate amount of nitrogen must be available at blossomtime, apply a nitrogenous fertilizer during the dormant season, early enough to have it available to the trees when blossoming starts. If ammonium sulfate is used, apply it even earlier than a nitrogenous fertilizer to be sure that it will be available to the trees when blossoming starts. If a green-manure crop is used, turn it under while it is still green and succulent.

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Itemized Determinations of Certain Basic Charges

Applying to conditions during early fall, 1946

I. Charge for use of tractors (based on 12,000 hours of life).

(Although farmers are turning rapidly to Diesel tractors, the gasoline type is shown here because the majority of growers are still using it.)

A. Approximately 20 h.p. (track type); initial cost.... $2,000.00
(720 hours of use annually)

Depreciation	$160.00	
Taxes (average)	10.00	
Interest (4 per cent on average investment)	50.00	
Fuel (2,160 gallons at 14 cents)	302.40	
Oil (56 gallons at 70 cents)	39.20	
Other oils and greases	5.40	
Shelter	1.75	
Repairs and servicing	80.00	
Insurance	10.00	
Total annual cost		$658.75
Cost per 9-hour day		8.23

B. Approximately 30 h.p. (track type); initial cost.... $2,600.00
(800 hours of use annually)

Depreciation	$173.00	
Taxes (average)	15.00	
Interest (4 per cent on average investment)	52.00	
Fuel (3,200 gallons at 14 cents)	448.00	
Oil (70 gallons at 60 cents)	42.00	
Other oils and greases	18.00	
Shelter	2.00	
Repairs and servicing	240.00	
Total annual cost		$990.00
Cost per 9-hour day		11.12

II. Charge for implements and machines (other than tractors and automobiles).

(This charge is made up of interest, depreciation, upkeep, and taxes. The figures are taken from table 9, page 23 of "Farm Management Crop Manual" by R. L. Adams, but adjusted to 1946 conditions.)

	Charge per day
Broadcaster	$0.60
Spike-tooth harrow, 16′	0.36
Spike-tooth harrow, 12′	0.27
Sprayer, 400 gallon	5.90
Sprayer, 300 gallon	4.42
Double disk, 8′	2.87
Disk ridger	1.92
Plank drag, 16′	0.10
Harvest equipment (sled, canvas, and mauls)	4.28
Brush burner	1.48
Spring-tooth harrow, 9′	0.42
Farm trucks	*Charge per mile*
¾ ton	$0.08
1½ ton	0.11

III. Charge for use of huller.

(New hullers being installed as available at cost of $3,600.00. In a year or two these should be taken into account when figuring costs.)

A. Initial cost, $1,800.00; life, twenty years; seasonal output, 50 tons.

Depreciation	$90.00	
Taxes (average)	15.00	
Interest (4 per cent on average investment)	36.00	
Electricity	12.00	
Shelter	10.00	
Repairs (annually)	100.00	
Total annual cost		$263.00
Cost per ton		5.26

B. Initial cost (huller and dryer), $2,400.00; life, twenty years; seasonal output, 15 tons.

Depreciation	$120.00	
Taxes	10.00	
Interest	48.00	
Electricity	4.00	
Shelter	10.00	
Repairs	20.00	
Total annual cost		$212.00
Cost per ton		14.13

IV. Replacements.

A. Charge for use of knocking-mallets and poles, per acre	$0.47
B. Use of canvas sheets, cost per acre (Records show variations of from $0.70 to $2.50 per acre, and an average of $1.42.)	1.42
C. Sacks (average, 10 per ton at 15 cents), cost per ton (Records show variations of from 6 to 13 per ton at 12 to 15 cents each.)	1.50
D. Use of "boat" or sled, cost per acre	0.25

V. Charge for management.

Grower estimates show reasonable charges per acre to be from $12.00 to $36.00, or an average per acre of $20.00.............. 20.00

VI. Interest rate on capital.

An average of grower reports shows a belief that 4 per cent is reasonable.

VII. Office expense (based on 40-acre orchard).

A. Telephone and telegraph (farm use)	$10.00	
B. Bookkeeping records	5.00	
C. Depreciation of office furniture, 10 per cent of value (Desk, $50; chair, $3; accessories, $5; bookcase, $5; filing cabinet, $15.)	7.80	
D. Stationery	2.00	
E. Stamps	3.00	
Total annual cost		$27.80
Cost per acre		0.70

VIII. Tree depreciation.

This consists of charging to each productive year its prorata share of the cost of bringing the orchard to bearing age. This is considered as the expenses during the first five years, which include preparing the land and planting; all cultural operations for five years, including use of machinery, labor, and supplies such as fertilizer, spray material, and irrigation water; and other expenses such as taxes, interest on investment, and charge for management. Charging to an interplanted crop its share of the expense for these five years leaves for the almonds about $400 an acre, which would be $10 per year depreciation when prorated over a period of forty years of productive life.

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COST CHART FOR ALMOND PRODUCTION, 1946

The two tabulations below indicate the approximate cost of producing almonds in 1946 through use of the information set forth in Itemized Determinations of Certain Basic Charges. These calculations are indicative of (A) the cost for orchards producing 1,200 pounds of in-shell almonds per acre; and (B) a figure of costs for a yield approximating the output per acre average of 750 pounds, in-shell, per acre for the state.

Based on Yield of 1,200 Pounds, In-shell, per Acre

Note: Abbreviations: M = man; W = woman; 30 T = 30 h.p., track-type tractor; 1½ Tr = 1½ ton truck; x = times, such as 2x = twice, 3x = three times; M/hrs. = man hours.

Most orchards are equipped with only a single tractor, usually 30 h.p. If a lower horsepower tractor is available, it may be used for this job.

I. CARE OF ORCHARD

A. Pruning

7 man-hours at $1.00 per hour	$7.00		
Use of pruning equipment	0.07		
Cost per acre			$7.07

B. Brush removal

Using 2 M, 30 T, sled:			
Wages	$18.00		
Use of tractor	11.12		
Use of sled	0.09		
Cost per day	$29.21		
Rate of work, 10 acres per day:			
Cost per acre			$2.92

C. Covercrop (40 per cent of bearing acreage)

1. Broadcasting

Using 2 M, 30 T, broadcaster:			
Wages	$18.00		
Use of tractor	11.12		
Use of broadcaster	0.60		
Cost per day	$29.72		
Rate of work, 40 acres per day:			
Cost per acre	0.74		
40 per cent		0.30	

2. Covering

Using 1 M, 30 T, 16′ spike harrow:			
Wages	$9.00		
Use of tractor	11.12		
Use of harrow	0.36		
Cost per day	$20.48		
Rate of work, 40 acres per day:			
Cost per acre	0.51		
40 per cent		0.20	

3. Seed

20 lbs. of Melilotus indica at 12 cents per lb.	$2.40		
40 per cent		0.96	
Total cost per acre of cover-crop			$1.46

D. Frost protection (25 per cent of bearing acreage)

1. Distributing heaters (full of oil)

Using 2 M, 30 T, sled:			
Wages	$18.00		
Use of tractor	11.12		
Use of sled	0.09		
Cost per day	$29.21		
Rate of work, 15 acres per day:			
Cost per acre	1.95		
25 per cent		0.49	

2. Lighting, 3x. 0.6 man-hours per time

Cost per acre per time	$0.60		
Total cost per acre	1.80		
25 per cent		0.45	

3. Refilling pots, 3x.

Using 2 M, 30 T, sled, and tank:			
Wages	$18.00		
Use of tractor	11.12		
Use of sled and tank	0.09		
Cost per day per time	$29.21		
Total cost (three fillings)	87.63		
Rate of work, 4.5 acres per day:			
Cost per acre	19.47		
25 per cent		4.87	

4. Gathering and storing pots (same as distributing heaters—see above)		0.49	

5. Use of pots (65 per acre at 65 cents each)

Depreciation	$4.22		
Taxes	0.74		
Interest	0.84		
Total annual cost	$5.80		
25 per cent		1.45	

6. Heater fuel

150 gallons per acre at 7½ cents per gallon	$11.25		
25 per cent		2.81	
Total cost per acre for frost protection			$10.56

H. Irrigating

1. Establishing borders, 2x.

Using 1 M, 30 T, disk ridger			
Cost per day per time:			
Wages	$9.00		
Tractor	11.12		
Use of disk ridger	1.92		
Total	$22.04		
Rate of work, 15 acres per day:			
Cost per acre per time	1.47		
Cost of two operations		2.94	

2. Applying water, 2x.

Cost per acre per time (4 M/hrs. at $1.00)	4.00		
Two irrigations		8.00	

3. Water

One acre-foot at $2.80		2.80	
Total cost of irrigating			$13.74

II. PREPARING FOR HARVEST

A. Dragging, 2x.

Using 1 M, 30 T, 16′ drag			
Cost per day per time:			
Wages	$9.00		
Use of tractor	11.12		
Use of drag	0.10		
Total	$20.22		
Rate of work, 40 acres per day:			
Cost per acre per time	0.51		
Cost per acre, 2 operations		1.02	

B. Preparing harvesting equipment

0.2 M/hrs. at $1.00		0.20	
Total preparing for harvest			$1.22

III. HARVESTING

A. Knocking and gathering

Using 4 M, 30 T (tractor running ¼ time), canvas, poles, mauls, sled, etc.			
Cost per day per time:			
Wages	$36.00		
Use of tractor	2.78		
Use of equipment	4.28		
Sacks	3.00		
Total	$46.06		
Rate of work, 2 acres per day:			
Cost per acre			$23.03

B. Hauling to huller

Using 1 M, 1½ Tr.			
Cost per day per time:			
Wages	$9.00		
Use of tractor	0.88		
Total	$9.88		
Rate of work, 3 tons per day:			
Cost per acre (yield of 1,200 lbs.)			$1.97

C. Hulling

Using 1 M, 4 W, huller			
Cost per day per time:			
Wages:			
Man	$9.00		
Women	27.20		
Use of huller	6.89		
Total	$43.09		
Rate of work, 1.6 tons per day:			
Cost per ton	28.73		
Cost per acre (1,200 pound yield)			$17.25

D. Drying (25 per cent of output; mostly dried on canvas sheets; hence, no additional charge for use of equipment)

2 M/hrs. per ton at $1.00	$2.00		
Cost per acre (1,200 pound output)	1.20		
Prorated (25 per cent)			$0.30

E. Hauling to warehouse

Using 1 M, 1½ Tr.			
Cost per day per time:			
Wages	$9.00		
Use of truck	4.40		

Based on State Average Yield of 750 Pounds, In-shell, per Acre

Note: Abbreviations: M = man; W = woman; 20 T = 20 h.p., track-type tractor; 1½ Tr = 1½ ton truck; x = times.

Most orchards are equipped with only one tractor, which is used for all operations.

I. CARE OF ORCHARD

A. Pruning

5 man-hours at $1.00 per hour	$5.00		
Use of pruning equipment	0.05		
Cost per acre			$5.05

B. Brush removal

Using 2 M, 20 T, sled:			
Wages	$18.00		
Use of tractor	8.23		
Use of sled	0.09		
Cost per day	$26.32		
Rate of work, 10 acres per day:			
Cost per acre			$2.63

C. Covercrop (40 per cent of bearing acreage)

1. Broadcasting

Using 2 M, 20 T, broadcaster:			
Wages	$18.00		
Use of tractor	8.23		
Use of broadcaster	0.60		
Cost per day	$26.83		
Rate of work, 40 acres per day:			
Cost per acre	0.67		
40 per cent		0.27	

2. Covering

Using 1 M, 20 T, 16′ spike harrow:			
Wages	$9.00		
Use of tractor	8.23		
Use of harrow	0.36		
Cost per day	$17.59		
Rate of work, 40 acres per day:			
Cost per acre	0.44		
40 per cent		0.18	

3. Seed

20 lb. Melilotus indica at 12 cents per lb.	$2.40		
40 per cent		0.96	
Total cost per acre of cover-crop			$1.41

D. Frost protection (25 per cent of bearing acreage)

1. Distributing heaters (full of oil)

Using 2 M, 20 T, sled:			
Wages	$18.00		
Use of tractor	8.23		
Use of sled	0.09		
Cost per day	$26.32		
Rate of work, 15 acres per day:			
Cost per acre	1.75		
25 per cent		0.44	

2. Lighting 3x. 0.6 man-hours per time

Cost per acre per time	0.60		
Total cost per acre	1.80		
25 per cent		0.45	

3. Refilling pots, 3x.

Using 2 M, 20 T, sled:			
Wages	$18.00		
Use of tractor	8.23		
Use of sled and tank	0.09		
Cost per day per time	$26.32		
Total cost (three fillings)	78.96		
Rate of work, 5 acres per day:			
Cost per acre	15.79		
25 per cent		3.95	

4. Gathering and storing pots

(Same as distributing heaters—see above)		0.44	

5. Use of pots (65 per acre at 65 cents each)

Depreciation	$4.22		
Taxes	0.74		
Interest	0.84		

G. Cultivating, 6x.

Using 1 M, 20 T, 5′ double disk			
Wages	$9.00		
Use of tractor	8.23		
Use of disk	1.56		
Cost per acre per time	$18.79		
Rate of work, 10 acres per day:			
Cost per acre per time	1.88		
Total cost per acre			$11.28

H. Irrigating (50 per cent of acreage)

1. Establishing borders, 2x.

Using 1 M, 20 T, disk ridger			
Wages	$9.00		
Use of tractor	8.23		
Use of disk ridger	1.92		
Cost per acre	$19.15		
Rate of work, 10 acres per day:			
Cost per acre per time	1.92		
50 per cent	0.96		
Total cost per acre		1.92	

2. Applying water, 2x.

Wages	$8.00		
50 per cent	4.00		
Total cost per acre		8.00	

3. Water

One acre-foot at $3.00	$3.00		
50 per cent		1.50	
Total cost of irrigation			$11.42

II. PREPARING FOR HARVEST

A. Dragging, 2x.

Using 1 M, 20 T, 16′ drag			
Wages	$9.00		
Use of tractor	8.23		
Use of drag	0.10		
Cost per day	$17.33		
Rate of work, 40 acres per day:			
Cost per acre per time	0.43		
Total cost per acre		0.86	

B. Preparing harvest equipment

0.5 M/hrs.		0.50	
Total cost per acre			$1.36

III. HARVESTING

A. Knocking and gathering

Using 4 M, 20 T (tractor running ¼ time), canvas, poles, mauls, sled, etc.			
Wages	$36.00		
Use of tractor	1.06		
Use of equipment	4.28		
Sacks	1.50		
Cost per day	$42.84		
Rate of work, 2 acres per day:			
Cost per acre		21.42	

B. Hauling to huller

Using 1 M, 1½ Tr.			
Wages	$9.00		
Use of truck	0.88		
Day's work: 3 tons	$9.88		
Cost per acre, 750 pound yield		1.24	

C. Hulling

Using 1 M, 4 W, huller			
Wages:			
Man	$9.00		
Women	27.20		
Use of huller	21.20		
Total	$57.40		
Rate of work, 1.5 tons per day:			
Cost per ton	38.27		
Cost per acre		14.34	

D. Drying (25 per cent of output)

2 M/hrs. per ton			
Cost per ton	$2.00		
Cost per acre	0.75		
25 per cent		0.19	

E. Hauling to warehouse

Using 1 M, 1½ Tr.			
Wages	$9.00		
Use of truck	4.40		

Cost per day per time	$29.21		
Total cost (three fillings)	87.63		
Rate of work, 4.5 acres per day:			
Cost per acre	19.47		
25 per cent		4.87	
4. Gathering and storing pots (same as distributing heaters—see above)		0.49	

5. Use of pots (65 per acre at 65 cents each)

Depreciation	$4.22		
Taxes	0.74		
Interest	0.84		
Total annual cost	$5.80		
25 per cent		1.45	

6. Heater fuel

150 gallons per acre at 7½ cents per gallon	$11.25		
25 per cent		2.81	
Total cost per acre for frost protection			$10.56

E. Pest control

1. Spraying, 2x.

Using 3 M, 30 T, 400-gallon sprayer:			
Wages	$27.00		
Use of tractor	11.12		
Use of sprayer	5.90		
Cost per day	$44.02		
Rate of work, 10 acres per day:			
Cost per acre per time	4.40		
Total, two sprayings		8.80	

2. Materials (two sprays)

400 gallons, 5-5-50 bordeaux			
800 gallons, 3-3-50 bordeaux			
Total cost (two sprayings)		7.92	
Cost per acre of spraying and materials			$16.72

F. Fertilizing

1. Spreading, 1x.

Using 2 M, 30 T, broadcaster:			
Cost same as for broadcasting cover-crop seed		0.74	

2. Fertilizer

Ammonium sulfate, 500 pounds at $50.00 per ton		12.50	
Total cost of fertilizing			$13.24

G. Cultivating, 6x.

Using 1 M, 30 T, 8′ double disk			
Cost per day per time:			
Wages	$9.00		
Tractor	11.12		
Use of disk	2.87		
Total	$22.99		
Rate of work, 20 acres per day:			
Cost per acre per time	1.15		
Cost per acre—6 cultivations			$6.90

Women	27.20	
Use of huller	6.89	
Total	$43.09	
Rate of work, 1.6 tons per day:		
Cost per ton	28.73	
Cost per acre (1,200 pound yield)		$17.25

D. Drying (25 per cent of output; mostly dried on canvas sheets; hence, no additional charge for use of equipment)

2 M/hrs. per ton at $1.00	$2.00	
Cost per acre (1,200 pound output)	1.20	
Prorated (25 per cent)		$0.30

E. Hauling to warehouse

Using 1 M, 1½ Tr.		
Cost per day per time:		
Wages	$9.00	
Use of truck	4.40	
Total	$13.40	
Rate of work, 6 tons per day:		
Cost per ton	2.23	
Cost per acre (1,200 pound yield)		$1.34

IV. MISCELLANEOUS TREE CARE

4 M/hrs. at $1.00	$4.00
Use of truck: 10 miles at 11 cents per mile	1.10
Total operating and harvesting costs per acre	$122.82

V. MISCELLANEOUS CHARGES

A. Taxes (at $3.65 per $100 of average assessed value of orchards, at $220 per acre)	$8.04	
B. Management	20.00	
C. Depreciation of trees ($400 to establish: 40 years of life)	10.00	
D. Interest on capital in orchard (4 per cent of $1,200)	48.00	
E. Compensation insurance (at $2.45 per $100 of payroll)	1.23	
F. Office expense	0.70	
G. Interest on operating capital (at 5 per cent on $100)	5.00	
Total misc. per acre		$92.97
Grand total (operating, harvesting, and miscellaneous) per acre		$215.79
Cost per lb. (in-shell) on basis of 1,200 lbs. of almonds per acre		0.17

Total cost per acre	1.80		
25 per cent		0.45	

3. Refilling pots, 3x.

Using 2 M, 20 T, sled:			
Wages	$18.00		
Use of tractor	8.23		
Use of sled and tank	0.09		
Cost per day per time	$26.32		
Total cost (three fillings)	78.96		
Rate of work, 5 acres per day:			
Cost per acre	15.79		
25 per cent		3.95	

4. Gathering and storing pots

(Same as distributing heaters—see above)		0.44	

5. Use of pots (65 per acre at 65 cents each)

Depreciation	$4.22		
Taxes	0.74		
Interest	0.84		
Total annual cost	$5.80		
25 per cent		1.45	

6. Heater fuel

150 gallons per acre at 7½ cents per gallon	$11.25		
25 per cent		2.81	
Total cost per acre for frost protection			$9.54

E. Pest control

1. Spraying

Using 3 M, 20 T, 300-gallon sprayer:			
Wages	$27.00		
Use of tractor	8.23		
Use of sprayer	4.81		
Cost per day	$40.04		
Rate of work, 8 acres per day:			
Cost per acre		5.00	

2. Materials

400 gallons, 5-5-50 bordeaux		3.60	
Total cost per acre for spraying			$8.60

F. Fertilizing (50 per cent of hearing acreage)

1. Spreading

Using 2 M, 30 T, broadcaster:			
Cost same as for broadcasting cover-crop seed—see above	$0.67		
50 per cent		0.33	

2. Fertilizer

Ammonium sulfate, 200 pounds at $50.00 per ton	$5.00		
50 per cent		2.50	
Total cost of fertilizing			$2.83

Cost per acre, 750 pound yield		1.24	

C. Hulling

Using 1 M, 4 W. huller			
Wages:			
Man	$9.00		
Women	27.20		
Use of huller	21.20		
Total	$57.40		
Rate of work, 1.5 tons per day:			
Cost per ton	38.27		
Cost per acre		14.34	

D. Drying (25 per cent of output)

2 M/hrs. per ton			
Cost per ton	$2.00		
Cost per acre	0.75		
25 per cent		0.19	

E. Hauling to warehouse

Using 1 M, 1½ Tr.			
Wages	$9.00		
Use of truck	4.40		
Total	$13.40		
Rate of work, 6 tons per day:			
Cost per ton	2.23		
Cost per acre		0.84	
Total cost per acre of harvest			$38.03

IV. MISCELLANEOUS TREE CARE

4 M/hrs.	$4.00
Use of truck	1.10
Total operating and harvesting costs per acre	97.25

V. MISCELLANEOUS CHARGES

A. Taxes (at $3.65 per $100 of average assessed value of orchards, at $155 per acre)	$5.65	
B. Management	20.00	
C. Depreciation of trees ($400 to establish: 40 years of life)	10.00	
D. Interest on capital in orchard (4 per cent of $750)	30.00	
E. Compensation insurance ($2.45 per $100 of payroll)	1.20	
F. Office expense	0.70	
G. Interest on operating capital (at 5 per cent on $80)	4.00	
Total misc. per acre		$71.55
Grand total (operating, harvesting, and miscellaneous) per acre		$168.80
Cost per lb. (in-shell) on basis of 750 lbs. per acre		0.22

CHARGES FOR ALTERNATIVE PRACTICES

A. Brush removal (using brush humer)

Using 1 M, 20 T, brush burner:		
Wages	$11.25	
Use of tractor	7.92	
Use of burner	1.48	
Cost per day	$20.65	
Rate of work, 9 acres per day:		
Cost per acre		$2.30

B. Broadcasting (green-manure seed or fertilizer, using truck)

Using 2 M, ¾-ton truck (15 miles per 40 acres), endgate seeder:		
Wages	$18.00	
Use of truck	1.20	
Use of seeder	0.64	
Cost per day	$19.84	
Rate of work, 40 acres per day:		
Cost per acre		$0.50

C. Opening furrows (irrigation)

Using 1 M, 20 T, furrower:		
Wages	$11.25	
Use of tractor	7.92	
Use of 9-foot furrower	1.28	
Cost per day	$20.45	
Rate of work, 25 acres per day:		
Cost per acre (per time)		$0.82

Note: Using 30 T with wages of $9.00, other cost items unchanged, cost per acre (per time) is 85 cents.

D. Floating

Using 1 M, 20 T, 10 x 22-foot wooden float:		
Wages	$11.25	
Use of tractor	7.92	
Use of float	0.19	
Cost per day	$19.36	
Rate of work, 30 acres per day:		
Cost per acre (per time)		$0.64

Note: Using 30 T with wages of $9.00, other cost items unchanged, cost per acre (per time) is 68 cents.

E. Harrowing (spring-tooth)

Using 1 M, 20 T, 9′ spring-tooth harrow:		
Wages	$11.25	
Use of tractor	7.92	
Use of harrow	0.38	
Cost per day	$19.55	
Rate of work, 25 acres per day:		
Cost per acre (per time)		$0.78

Note: Using 30 T with wages of $9.00, other cost items unchanged, cost per day is $20.95; and cost per acre (per time) is 84 cents. Using 30 T, other cost items unchanged, cost per acre (per time) is increased 13 cents; and total cost per acre (per time) is 91 cents.

F. Hulling

Contract rate is about 2½ cents per pound.

THIS CIRCULAR

ON COSTS IN ALMOND PRODUCTION

is intended as a planning guide for general orchard operation and harvesting. The study includes items of cost and method of figuring costs. The results are summarized in a chart which shows two studies of costs for 1946. One is based on a yield of 1,200 pounds, in-shell, per acre; the other on the state average yield of 750 pounds, in-shell, per acre. In addition, a list of charges for alternative practices is also given.

THE ALMOND INDUSTRY

IS STEADILY GROWING IN IMPORTANCE

through planting orchards on better soils and giving soil and trees better care. A description of certain improved cultural practices is therefore also given in this circular.

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